ABSTRACT

A receiver receives an RF-band modulated signal transmitted from a transmitter, as well as an un-modulated carrier also transmitted from the transmitter and having a phase noise characteristic coherent with that of the modulated signal, and a product of the two components is generated to thereby restore an IF-band transmission source signal. In the receiver, a small planar antenna having a broad beam characteristic such as a single-element patch antenna is combined with an amplifier and a mixer circuit, which are formed on a micro planar circuit by an MMIC technique, so as to form a unit receiving circuit. A plurality of such unit receiving circuits are disposed on the receiver at intervals smaller than a wavelength corresponding to an IF band, and detection outputs from the unit receiving circuits are power-mixed. Thus, the receiver serves as a high-gain antenna having a detection function, and can realize a broad beam radiation characteristic comparable to that of a single-element antenna. The composed IF-band composite output is demodulated in an IF-band demodulation circuit. The present invention enables construction of a low-cost radio communication system, transmission of high-quality signals, and production of a wide beam antenna which has a high gain and which is convenient for use.